

Ames students make West Nile Virus risk map for Monterey

A map showing the potential risk of West Nile virus being carried by mosquitoes in Monterey County is the product of four students who worked this summer at NASA Ames.

The students made ground surveys of mosquito habitats and matched their data with satellite pictures and data to make a countywide map that officials are using to help deploy mosquito abatement teams and equipment. The college and high school students used a computer program that creates maps with special color-coding to identify objects and areas on the ground as varied as specific crops, animal habitats and urban areas. This type of computer program helps scientists analyze and manage large numbers of digital images and other information.

"The students for the first time have produced a risk map for the human population in Monterey County, which includes the general area of Carmel, Calif.," said Jay Skiles, an Ames research scientist and mentor for the student team. "The map shows the location of at-risk humans who are 55 and older and their proximity to West Nile virus-carrying mosquito habitat."

The virus causes a version of the sometimes-fatal disease encephalitis that results in inflammation of the brain and spinal cord. The student study and map enable Monterey County officials to more effectively direct their mosquito abatement program to areas where the West Nile virus would most likely affect human beings, according to Skiles. The students made a presentation about their study to the county board of supervisors in September. In addition, the students made presentations to the Western Governors' Association in September in Montana and will later present to the National Mosquito and Vector Control Conference in Georgia.

Students sampled standing water to gather evidence of mosquitoes that can carry the West Nile virus. The team correlated ground observations with satellite imagery to identify countywide mosquito habitat.

"We did field work to identify vegetation that is associated with mosquito habitat," said Emily Clary, a team member who is a student pursuing a master of science degree in geography at the University of New Mexico, Albuquerque, N.M.

Specific combinations of variously colored light frequencies and other energy reflected by the surface of the Earth serve as spectral 'fingerprints' that the students used to zero in on where mosquitoes breed. The satellite pictures and data enable scientists to observe and analyze wide areas that otherwise could

not be accurately surveyed without the help of thousands of volunteers on the ground.

The virus was first documented in North America in 1999, according to student Elizabeth Ballif of Utah State University. "Last year alone over 4,000 human cases were reported, resulting in nearly 300 deaths," Ballif said.

"What's really important is that students recommended additional mosquito surveillance in places where the county isn't doing surveillance," said Cynthia Schmidt, 'Develop' program coordinator at Ames. 'Develop,' a student applications and workforce development program, focuses on the community benefits of Earth science.

"The county will be forewarned of the presence of the virus before it hits populated areas," Schmidt added.

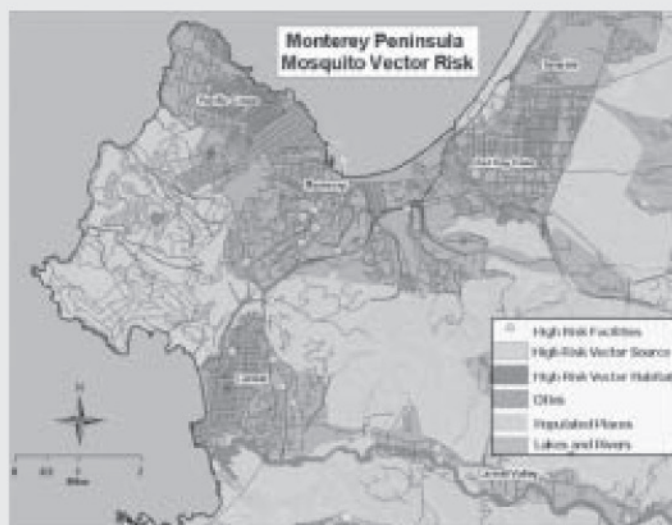
The Western Governors' Association in Denver announced in May the selection of students from western universities who received training and internships in applied Earth science, including remote sensing. Remote sensing is the use of satellite and aerial images to monitor and investigate environmental, health, agricultural and other issues.

"This summer, the students learned skills such as remote sensing, image interpretation and geographic information system techniques," Skiles said.

"It seemed like what we were doing is actually putting out a useful product," said 16-year-old Kevin Hsu, a student at Gunn High School in Palo Alto. "A lot of the NASA scientists were very helpful and willing to share. It was quite exciting to work with people at levels from high school up to graduate level," Hsu added. He is the only high school student on the West Nile virus team.

The other team members, their schools and the degrees they are pursuing are: Ballif, of Utah State University, bachelor of science, geography; and Alex Hogel, of the University of Utah, bach-

elor of science, geography. The university students took part in the 'Develop' program. Student teams research state, tribal and local problems and create 3-D computerized visualizations to help gov-



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ernment and industry better understand how NASA technology can help with issues of community concern.

Other students working in the 'Develop' program at NASA Ames are conducting studies of the Pyramid Lake Paiute tribe reservation in Nevada. The primary objectives of this project are to use remote sensing and ground-based methods to map and monitor invasive and noxious plant species that are rapidly encroaching upon the northern Nevada territory. The project also includes organizing new and existing data to create a database of information about wildfire fuel on the reservation.

The Applications Division of NASA's Earth Science Enterprise funds the program. The Western Governors' Association is an independent, nonprofit organization representing the governors of 18 states, American Samoa, Guam and the Northern Mariana Islands.

Images of the Monterey County West Nile virus risk map and other publication-size images are available on the Internet at: <http://amesnews.arc.nasa.gov/releases/2003/03images/westnile/westnile.html>.

BY JOHN BLUCK ▲